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# PATENT SPECIFICATION

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## PROVISIONAL SPECIFICATION

### Improvements in or relating to Gas Heated Boiling Pans, Boilers, Utensils and the like

We, DEAN CHANDLER, British subject, of 709, Old Kent Road, London, S.E.15, JOSEPH HANSON BARRALET, British subject, of 24, 25 & 27, Addington Square, London, S.E.5, and SOUTH METROPOLITAN GAS COMPANY, a company organised under the laws of Great Britain, of 709, Old Kent Road, London, S.E.15, do hereby declare the nature of this invention to be as follows:—

This invention relates to gas heated boiling pans, boilers, utensils (e.g. kettles and saucepans) and the like, hereinafter referred to as "pans".

The main object of the present invention is to provide means for heating a pan in such manner that the heat of the products of gas combustion is extracted from the products and passed to the pan in an efficient manner.

According to the present invention the outer surface of the pan is arranged to form conjointly with a flue plate (or the "setting" for the pan) a flue with which the products of gas combustion from a gas burner discharge, and the pan has secured to its outer surface a series of projections of copper or other material having a high heat conductivity factor and which extend preferably completely across the flue to constitute local obstructions therein. When now products of gas combustion flow through the flue, the projections are heated by the products and transmit their heat by conduction to the pan which is of course additionally heated by the products which sweep over the outer surface of the pan. Since the projections extend across the flue, heat is extracted by them from the products over the whole width of the flue and thus the heat of the products is efficiently utilised to heat the pan (and hence the contents of the pan). It will be appreciated that as heat is transmitted from the projections to the pan by conduction it is necessary that the projections have close mechanical contact with the pan and this is effected by soldering or brazing the projections to the pan.

A convenient arrangement of projections is provided by coiling a length of

copper wire of square or circular cross-section or of ribbon section into a helix of small pitch and of sensible elliptical cross section and bending the helix thus formed around the outer surface of the pan, the turns of the helix where they engage the pan being secured thereto by soldering or brazing. It will be apparent that the turns of the helix constitute the projections which extend across the flue space.

If desired the shape of the cross section of the helix may be modified to provide in effect a double loop giving an increased area of projection: for example, the major curved part of the single ellipse at the side remote from the pan can be bent centrally and inwardly until it contacts with the other major curved part, thus providing in cross section two end loops joined by a central double part.

In order to increase the area of mechanical contact between the turns of the helix and the pan, the turns may each be shaped locally to conform over a substantial length with the shape of the pan, e.g. for a pan the outer surface of which is convex the turns may have a concave part.

A plurality of such helixes may be placed around the pan, the helixes occurring one after the other in the flue so that the products pass in succession through the turns of the helixes. For example, a sugar boiling pan which is more or less part spherical in shape can have two or more helixes bent concentrically around it on different diameters; or again in the case of a pan of inverted frusto-conical shape and having a part spherical bottom of large radius, three helixes can be bent concentrically around the bottom of the pan each on a different diameter of the sphere.

As has been stated, the flue is formed in part by a flue plate and this plate may be secured to the pan through the intermediary of the projections or it may be carried by the setting for receiving the pan in which latter case the pan (together with the projections or helixes secured to it) can be lifted away from the flue

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plate. The setting can of course be of refractory material.

In the particular case of a kettle, saucepan or other domestic utensil which is intended to be placed on a fret or grill below which is a gas burner it will generally be preferred to connect the flue plate to the helix: as an example, a kettle has bent around and secured to its base at or near its periphery a single length of helically wound wire and secured to the outer part of some or all of the turns of the helix is an annular plate concentric with the circular base of the kettle. Thus the helix holds the plate in spaced relation from the base of the kettle and so a flue is formed across which the turns of the helix extend. When the kettle is placed over a gas burner, the products of combustion impinge on the base of the kettle and are deflected thereby to pass through the flue.

The products of combustion can pass either from a bunsen burner or a

luminous burner: the invention enables luminous burners to be used with advantage for the reason that such burners require for efficient operation to be located further from the pan to be heated than bunsen burners and as the projections in accordance with the invention operate to extract heat from the products and then to conduct the heat to the pan, the luminous burners can be located in the desired position without loss of overall efficiency.

It will be apparent that the invention is capable of general application to gas heated pans and the like: reference has been made to a gas heated sugar boiling pan and to kettles and saucepans and other examples of the use of the invention are fish frying pans and coppers.

Dated the 13th day of November, 1936.

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## COMPLETE SPECIFICATION

### Improvements in or relating to Gas Heated Boiling Pans, Boilers, Utensils and the like

We, DEAN CHANDLER, of 709, Old Kent Road, London, S.E.15, JOSEPH HANSON BARRALET, of 24, 25 & 27, Addington Square, London, S.E.5, both British subjects, and SOUTH METROPOLITAN GAS COMPANY, a company organised under the laws of Great Britain, of 709, Old Kent Road, London, S.E.15, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to gas heated boiling pans, boilers, utensils (e.g. kettles and saucepans) and the like, hereinafter referred to as "pans".

The invention is particularly concerned with a gas heated pan of the kind in which a flue is formed between the pan and a flue plate or setting, the products of combustion from a gas burner discharging into the flue and in which one or more helically wound coils of heat conducting material are secured to the flue forming face of the pan so as to extract heat from the products passing through the flue and to convey the heat by conduction to the pan.

According to the present invention the coil or each coil is dimensioned to extend from the pan completely or substantially completely across the flue so

that heat extracted over the whole (or substantially the whole) of the width of the flue is conducted by the coil or coils to the pan. The coils may be formed from strips of metal, preferably copper of square, circular or ribbon cross section, and in order to increase the area of mechanical contact between the turns of the helix and the pan the turns may each be shaped locally to conform over a substantial length with the shape of the pan. As heat is transmitted from the coils to the pans by conduction it is necessary that the coils have close mechanical contact with the pan and this is effected by soldering or brazing the turns of the helix to the pan.

In the particular case of a kettle, saucepan or other domestic utensil which is intended to be placed on a fret or grill below which is a gas burner it will generally be preferred to secure a flue plate to the helix, the flue plate forming between itself and the utensil, the flue for receiving the products of combustion: as an example, a kettle has bent around and secured to its base at or near its periphery a single length of helically wound wire and secured to the outer part of some or all of the turns of the helix is an annular plate concentric with the circular base of the kettle. Thus the helix holds the plate in spaced

relation from the base of the kettle and so a flue is formed across which the turns of the helix extend. When the kettle is placed over a gas burner, the products of combustion impinge on the base of the kettle and are deflected thereby to pass through the flue.

The products of combustion can pass either from a bunsen burner or a luminous burner: the invention enables luminous burners to be used with advantage for the reason that such burners require for efficient operation to be located further from the pan to be heated than bunsen burners and as the projections in accordance with the invention operate to extract heat from the products and then to conduct the heat to the pan, the luminous burners can be located in the desired position without loss of overall efficiency.

The invention is illustrated in the accompanying drawings in which figure 1 is a sectional elevation of one arrangement, figure 2 a part sectional view of a modified arrangement, figure 3 a detail view of a still further modification.

Referring firstly to figure 1, 1 indicates the water receiving part or pan of a gas copper which is to be heated by the flames passing from burners 2 supported by a frame 3 below the base 4 of the pan. Below the base of the pan and parallel with it is a plate 5 which together with the base 4 of the pan defines an annular flue 5<sup>1</sup> opening at its inner periphery to the space above the burners 2 and opening to discharge at its outer periphery.

In the flue are projections arranged to extract heat from the products of combustion passing through the flue and to convey the heat by conduction to the pan 1. These projections are formed by coiling lengths of wire of copper (or other heat conducting material) into helixes of small pitch and shaping the helix so formed to fit around the surface of the pan 1 and securing them to the pan by brazing, welding or soldering. In the arrangement shown in figure 1, four such helixes are indicated at 6 and the helixes are of circular form and the turns of the helix are secured to the pan 1 at their points of contact with the pan. The helixes are of such diameter that they extend completely across the flue 5<sup>1</sup>, i.e. from the base 4 of the pan 1 to the plate 5. The helixes may be secured to the flue plate 5 as well as to the pan 5 but in general they would merely rest against the flue plate 5 to enable the pan 1 to be lifted (together with the attached helixes) from the supporting frame which is indicated at 7 and by which the

burners 2 and flue plate 5 are supported.

In order to increase the area of contact between the turns of the helixes and the base of the pan 1, the coils of the helix may be flattened or made of elliptical form: such an arrangement is shown in figure 2 in which there is shown a sugar boiling pan 8 having two helixes 9, of elliptical cross section secured by brazing, soldering or welding to the pan 8 and extending across a flue 10 formed between the setting 11 for the pan, the products of combustion passing through the flue 10 from burners which are again indicated at 2.

Another form of helix is shown in figure 3 in which each turn of the helix is shaped to form a double loop 12, 13 united by a central double part 14.

The turns of the helix of whatever shape could be formed locally to conform with the shape of the pan so as to increase the area of contact (and hence the heat conduction) between the turns and the pan. For example in figure 2, the elliptical coils of the helixes could be made slightly concave to fit over the convex face of the pan 8.

It will be seen that when products of combustion flow through the flue formed between the pan 1 or 8 and the flue plate 5 or the setting 11 the turns of helixes 9 are heated by the products and transmit their heat by conduction to the pan, which is moreover additionally heated by the products sweeping over the outer surface of the pan. Since the coils extend across the flue, heat is extracted from them the whole width of the flue and thus the heat of the products is efficiently utilised to heat the pan and hence the contents of the pan.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A gas heated pan of the kind referred to and wherein the coil or each coil is dimensioned to extend from the pan completely (or substantially completely) across the flue so that heat extracted over the width of the flue is conducted by the coil or coils to the pan.

2. A pan as claimed in claim 1 and in which each coil of the helix is shaped to contact with the pan over an extended area.

3. A pan as claimed in either of the preceding claims and in which each coil of the helix is shaped to provide a double loop united by a central double part.

4. A pan substantially as described with reference to the accompanying drawings.

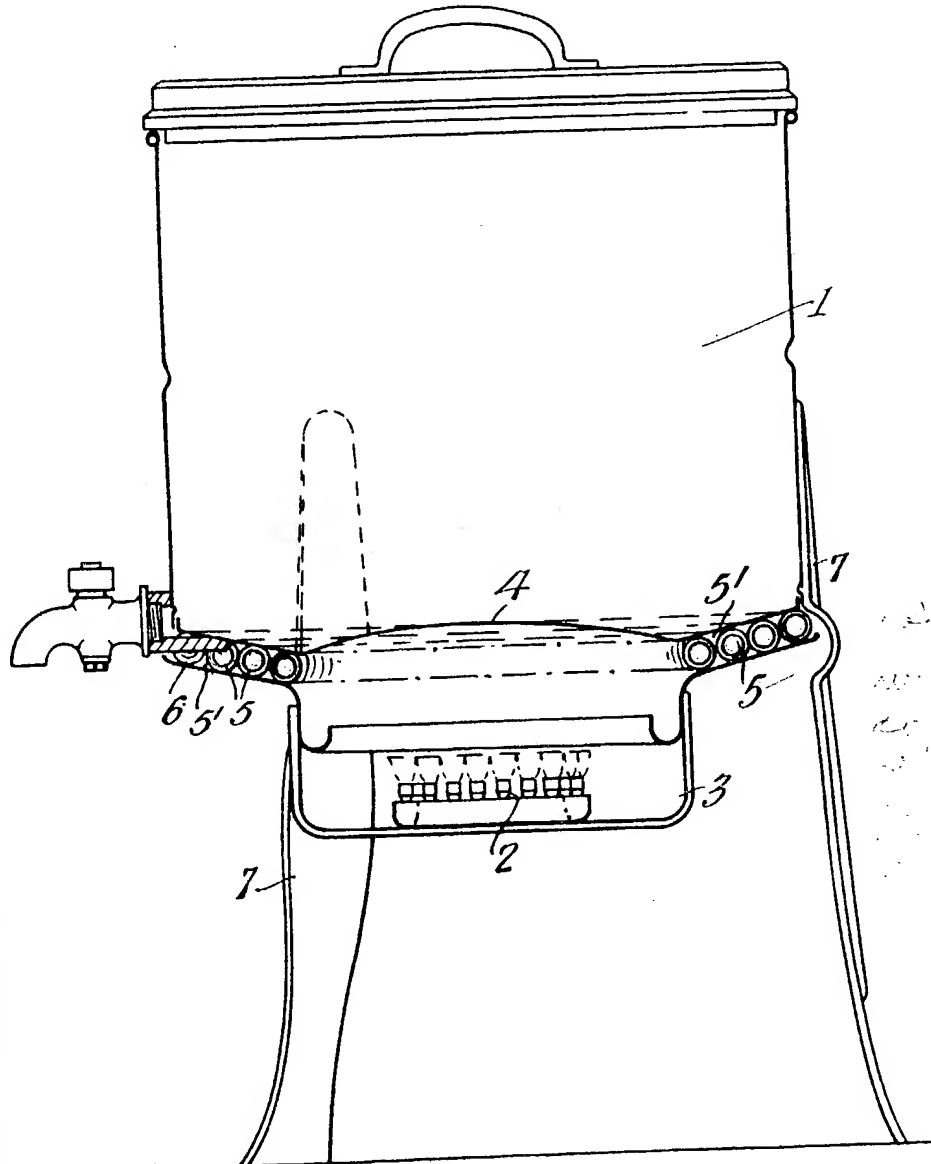
Dated the 15th day of November, 1937.

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*Fig. 1.*



[This Drawing is a reproduction of the Original on a reduced scale.]

*Fig. 3.*



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*Fig. 2.*

